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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,625	01/28/2004	Srinivasamohan Narayanan	SL1207	5653
7590	07/14/2006		EXAMINER MENZ, DOUGLAS M	
BP America Inc. Docket Clerk BP Legal, M.C 5 East 4101 Winfield Road Warrenville, IL 60555			ART UNIT 2891	PAPER NUMBER

DATE MAILED: 07/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/767,625

Applicant(s)

NARAYANAN ET AL.

Examiner

Douglas M. Menz

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 1-16, 22-27, 29 and 30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 17-21, 28 and 31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 17 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Fraas et al. (US 5091018).

Regarding claim 17, Fraas et al. (US 5091018) discloses a process for making a photovoltaic device using a substrate comprising silicon doped with a first dopant (Col. 6, lines: 18-30), the process comprising the steps of:

(a) forming a first layer (64, Fig. 8A) of the substrate (61, Fig. 8A), the first layer comprising a second dopant (p-type) of a conductivity type opposite the first dopant (n-type) (Col. 6, lines: 58-65);

(b) disposing over the first layer a surface coating (66, Fig. 8A) such that a back surface of the substrate is free or substantially free of the surface coating (Col. 7); and

(c) removing the second dopant from the back surface (65, Fig. 8A-B) such that the back surface is free or substantially free of the second dopant (Col. 7, lines: 1-18).

Regarding claim 28, Fraas further discloses wherein the surface coating (62) is formed such that only a back surface of the substrate is free or substantially free of the surface coating. Fraas states that the surface coating 62 is formed over the entire upper surface of substrate 61, which reads on claim 28, after this, the surface coating 62 is treated to form openings (Col. 6).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fraas et al. (US 5091018).

Fraas discloses the process steps of claim 17 as mentioned above, however, Fraas does not explicitly disclose that the surface coating (66, Fig. 8B) comprises silicon nitride. Fraas does disclose that such layer is a protective photoresist layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a surface coating comprising silicon nitride since silicon nitride was commonly used and well known in the art as a protective photoresist layer.

Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fraas et al. (US 5091018) in view of Rittner (US 4135950).

Regarding claim 18, Fraas discloses the process of claim 17 as mentioned above. However, Fraas does not disclose further comprising the step of texturing the substrate.

Rittner discloses a silicon solar cell structure wherein the substrate is textured (Fig. 2 and Col. 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to texture Fraas's substrate as taught by Rittner because Rittner explicitly discloses that such features are for optimizing the power output of the solar cell throughout its design lifetime (Col. 2, lines: 55-65).

Regarding claim 19, Rittner further discloses the process of removing the texture from the back surface such that the back surface is substantially smooth (Fig. 2 and Col. 1, lines: 54-55 and Col. 2, lines: 40-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to remove the texture from the back surface such that the back surface is substantially smooth because Rittner explicitly discloses such a step in the process of forming an electron reflecting region (Col. 2, lines: 40-46).

Regarding claim 20, Rittner further discloses the step of forming a back surface field (p<sup>+</sup> region, Fig. 2 and Col. 2, lines: 40-47). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a back surface field into Fraas's device for the purpose of increasing the efficiency of the device. To further support the Examiner's position that Rittner's p<sup>+</sup> region constitutes a back surface field used to increase the efficiency of the device see Mowles (US 6541695) (Fig. 2A and Col. 10, lines: 5-20).

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fraas et al. (US 5091018) in view of Minahan et al. (US 4610077).

Fraas discloses the process steps of claim 17 as mentioned above, however, Fraas does not disclose that the surface coating is also formed on the periphery of the back surface. Minahan discloses a process for fabricating a solar cell which incorporates a surface coating (24, Fig. 1g) that is disposed over the first layer of the

substrate and also formed on the periphery of the back surface (Fig. 1g). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Minahan's surface coating geometry into Fraas's process for the purpose of facilitating the construction of the metal contacts as taught by Minahan (Cols. 4-5).

### ***Response to Arguments***

Applicant's arguments with respect to claims 17-21 and 28 have been considered but are moot in view of the new ground(s) of rejection. Specifically, applicant has amended claim 17 to clarify the chronology between elements (a) and (b) and argues that the previous rejection has been overcome by such changes to the claim language. Examiner agrees with applicant and has therefore changed the grounds of rejection such that Fraas's layer 66, Fig. 8B, is now regarded as Applicant's "surface coating".

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas M. Menz whose telephone number is 571-272-1877. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DM

*Doug My 7/10/06*